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ABSTRACT

Nine volunteers from a 17-member physics method class in a preservice teacher education program at Queen's University of Kingston (Canada) participated in a private WebCT forum in which they could explore various aspects of their learning during the second half of their program. This paper responds to two central questions from this use of WebCT technology to foster self-study by preservice teachers: (1) Did WebCT provide an improved alternative for making public one's personal reflections while beginning the self-study process? and (2) Did self-study begin in a significant way, and to what extent did the WebCT technology contribute to its success? Data are presented in tables reporting excerpts from 8 of the 13 threads that include 81 of the 100 messages posted on the Bulletin Board feature of WebCT. Several conclusions are elaborated in light of the data presented. (AEF)

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Using WebCT Technology to Foster Self-Study by Teacher Candidates After an Early Extended Practicum

By Tom Russell

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Using WebCT[1] Technology to Foster Self-Study by Teacher Candidates after an Early Extended Practicum[2]

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> *First I have to comment on WebCT. WOW! I can't believe the amount of participation that has taken place this winter term in comparison to the Fall Term. The ball is certainly rollin'! Honesty is a great thing in most cases. I think that WebCT allows people to express their views in a way that removes us as people from the situation. Personally I'm not going to be embarrassed when I hit the "post" box on this page, no matter what I've written.*
> [TC, 15 Feb, in Thread J: Big Picture: Experience and ... (Theory?)]

Introduction

Nine volunteers from a 17 member physics method class in a preservice teacher education program volunteered to participate in a private WebCT forum in which they could explore various aspects of their learning during the second half of their program. This paper responds to two central questions from this use of WebCT technology to foster self-study by those learning to teach:

- Did WebCT provide an improved alternative for making public one's personal reflections while beginning the self-study process?
- Did self-study begin in a significant way, and to what extent did the WebCT technology contribute to its success?

The following conclusions are developed concerning the use of WebCT technology to foster self-study by teacher candidates after an early extended teaching practicum:

[1] Information about WebCT is available at http://about.webct.com and http://www.webct.com.
[2] The research reported here was supported by the Social Sciences and Humanities Research Council of Canada as part of the 1999-2002 study, "Understanding Programme Change in Teacher Education: Sharing the Authority of Experience."

1. WebCT provided a unique forum for those who were willing to take the time to discuss particular issues and share their experiences and views. Self-study by candidates was readily apparent.
2. WebCT gave me, as teacher, insights into reactions to my teaching that I was not likely to gain in any other way. My own self-study was stimulated and I gained valuable opportunities to improve my teaching.
3. New technology involves a learning curve. Individuals seemed to become comfortable quickly and made good use of what the technology enabled them to do.
4. Some individuals contributed far more than others. All seemed comfortable with the variation in the number of contributions.
5. Making WebCT optional was the right choice for my first attempt to explore what is possible with the technology. I plan to continue to encourage people to take up the option while I provide meaningful alternatives for those who do not.
6. Revisiting the WebCT discussion provided a unique and invaluable way to see how those I was teaching were affected not only by my moves as their teacher but also by various elements of the overall preservice teacher education program structure.

The Setting

Self-study requires both critical reflection by individuals and sharing one's insights with others (Loughran & Northfield, 1998). The pace of an intensive practicum experience often works against self-study, and the potential of e-mail for sharing of insights is often limited by difficulties of access and decisions about how widely insights should be shared. In this study, WebCT emerged as an attractive technology because it is accessible from any computer with a web browser and an internet connection. By connecting to the course WebCT site, participants had easy access to course

materials supporting self-study and to an electronic discussion facility. All participants were volunteers with the right to withdraw at any time without question or pressure.

Participants in this self-study exercise were nine teacher candidates from a total of 17 members of the physics method class in the preservice teacher education program at Queen's University. The participants and their colleagues in physics first met when the Fall Term (September-December) of the program began with three weeks of university classes in September. The class dispersed to 16 different Ontario secondary schools to teach mathematics, science, or computer studies for an initial period of six weeks. Another period of on-campus classes took the group to the end of November, when they returned to their schools for the final three weeks of the early extended practicum.

The Winter Term (January-April) began on 10 January with a six-week period of classes. In the first week, volunteers were invited to join a "private" forum within WebCT with the title "Winter Term Learning" and eight individuals volunteered to participate on the understanding that doing so would satisfy the requirements for one of six term assignments. Message No. 1 was posted on 17 January and Message No. 100 was posted on 7 April, when candidates left Queen's for a final three-week teaching assignment in their Fall Term schools. More than 85 of the messages were posted before an "alternate practicum" began on 21 February. This paper summarizes various aspects of both content and process as conducted and recorded using WebCT. These volunteers understood that I would be analyzing and reporting excerpts from the data and that they could withdraw at any time without penalty or explanation.

I should point out that the data here rely only on the "Bulletin Board" feature of WebCT and this is but a small part of the total package of teaching and learning resources within WebCT. The "compile" feature of the Bulletin Board made it easy to produce a single file containing messages identifiable on a thread-by-thread basis.

Overview of the Data

The file compiled from the Winter Term Learning Forum contains 23,000 words. If sheer volume is any indication, something significant did happen for the nine participants in this private forum. In Table 1, below, an asterisk (*) indicates each thread that is illustrated in the presentation of data. The initials after the title of each thread indicate the person who initiated it. A plus sign (+) after the number of participants indicated that I, as teacher, made at least one posting to the thread.

	Title of WebCT Thread (Initials indicate person who initiated the thread)	Number of participants	Number of messages	Date of first message	Date of last message
A *	So I shall start.... LL	5 +	10	17 Jan	26 Jan
B *	The nature of science TP	6 +	13	19 Jan	11 Feb
C *	Action research.... LL	6 +	9	23 Jan	4 Feb
D *	Recognizing good teaching TR	6 +	15	24 Jan	14 Feb
E *	Batteries and Bulbs (and more)— So What? TR	3 +	4	27 Jan	1 Feb
F *	Dissention in the ranks... TP	5 +	11	2 Feb	9 Feb
G *	Physics second teachable BE	5	5	3 Feb	5 Feb
H	Rob's POE[3] BE	3 +	4	8 Feb	9 Feb
I	POE site BE	2	2	8 Feb	9 Feb
J *	Big picture: Experience and ... (theory?) TR	7 +	14	10 Feb	17 Feb
K	Drawing out knowledge EB	3	3	14 Feb	24 Feb
L	Alternative practicum CS	3	3	23 Feb	28 Feb
M	Motivation? LL	5 +	7	22 Mar	7 Apr
ALL	13 threads or topics	9 +	100	17 Jan	7 Apr

Table 1. Overview of Winter Term Learning discussion using WebCT.

The sheer volume of data makes some selection essential. For present purposes I have selected the threads that generated the most discussion and the topics that seem to best illustrate the range of ways in which candidates made use of the potential of WebCT in relation to learning to teach. Within the selected threads, I have selected those postings that seemed to capture the range of views and the development of each discussion. I have probably erred on the side of presenting too much data. The aspects that I wish to illustrate in reporting on my first use of WebCT technology to promote self-study by teacher candidates include the following:

[3] POE stands for Predict-Observe-Explain, a teaching procedure that involves asking students to predict and explain what will happen before they observe what does happen and build a final explanation.

- Getting discussion started (A)

  Having volunteered to participate, Thread A served to "break the ice."

- Threads initiated by teacher candidates (B, C, F, G)

  These four threads, initiated by three different individuals, contain more than one-third of the 100 messages. Here they explored issues that interested them, including Thread F, which examined a tension within our classes.

- Threads initiated by the teacher (D, E, J)

  Thread E proved very short, while Threads D and J drew considerable discussion.

- Threads with a specific self-study purpose (D, J)

  Threads D and J represent my efforts to initiate self-study by these volunteer participants, and I was pleased with the results of my efforts to connect Winter Term perspectives with Fall Term practicum experiences.

- A thread in which candidates' self-study compels me to study my teaching carefully (F)

  In Thread F, WebCT revealed its potential to explore and resolve a tension within the teaching-learning context that we shared with those not in the Forum.

Data Illustrating Self-Study Using WebCT Technology

The data that follow are extensive. Data are presented in tables that report excerpts from eight of the 13 threads that include 81 of the 100 messages posted. The first column in each table provides the initials of the author and the date of the posting. The second column provides an excerpt from that individual's posting. In the third column, I provide my personal interpretation of the excerpt; statements within quotation marks in this column express my attempt to summarize, in other words, what the individual seems to be saying.

It is not necessary to read the entire presentation of data before moving to the remainder of the paper. It may be more valuable to select, from the eight tables that follow, only three or four

threads of particular interest, using the preceding "Overview of the Data" to make one's selections. The "Discussion and Conclusion" section does not depend on reading the entire data set, which could be revisited and explored subsequently.

THREAD A: SO I SHALL START...

LL posted the first message in the first thread, which ran for nine days and served to "start the ball rolling." They seem to see WebCT as promising. Now that they have time AND experience, they have something to discuss using WebCT. They have had enough "reflection" and are eager to do something they see as very different from reflection—finding answers that will help them teach next year.

	Excerpts selected for illustration of discussion	**Interpretation**
LL 17 Jan	First, this WebCT stuff does have potential I think. It's just not really all that fun if you are the only one doing it though. I do give TP credit for really trying during the first term but I just felt that I had so much other things on my plate that I really didn't have a lot of time to spend to do this sort of thing. I suppose part of the difficulty is that I didn't find myself to have a lot of time to reflect on things as a whole. I found myself doing little reflections interspersed throughout my day rather than reflecting on events as a whole. Besides, a lot of reflection was done verbally with my associate. To do the whole process of logging onto something and then typing after working on preparing things on the computer didn't seem so enticing to me. Yet, if everyone did this sort of thing, maybe I would be more excited about it.	"I didn't have a lot of time, while teaching, to work out the big picture using WebCT."
FP 18 Jan	I can relate to being tired. For me, that was more evident in November than now. The thing I noted this time around is that it took Tom a whole week before I again felt that excitement, the promise of ever-expanding possibilities. He did it with the open assignments.	One person was excited when invited to develop his own assignments.
TP 18 Jan	One thing that I did reflect on was '84 ways...' and how Tom said it was aimed at con-ed's [concurrent students]. He was 100% right. I realized that while I was teaching, I wasn't worried about adding sparkle, I was worried about getting the material across without transmitting a verbal sedative! I think that document and all the info involved will be most useful in a couple of years, when I get into the swing of things and decide it's time to add that sparkle. It could come sooner, but I tend to be a poor judge of time.	"I need more experience before I can see the value of some of the resources Tom has given us."
CS 18 Jan	I like this WebCT idea. I kept forgetting to check it before, but I think now we all have a little more time and much more to say about our experiences. It seems a little strange though, since we will still be seeing each other twice a week. Perhaps class could be considered a "realtime" and "live" WebCT exchange. See you tomorrow.	"WebCT is working now that we have time AND experiences."
LL 21 Jan	So, here I am on Friday and I'm trying to get my thoughts in order to complete my write up for the action research project and I thought I'd look at some of the responses on this WebCT. Actually, I'm quite impressed at how it's working. I suppose I can use this as a venting of sorts. I'm always looking for people to listen to my whining...sometimes... In yesterday's class I think I was starting to feel like there was some direction. For the longest time, I guess I was wondering where Tom	It is four days since the WebCT discussion began and LL is pleased with the earliest entries.

	Excerpts selected for illustration of discussion	Interpretation
	was taking things. To be honest, Tom, I was wondering when things would start becoming clearer. I feel like the time at Queen's is a time of reflection but I was wondering how much more "reflection" can I stand. I don't mean to be so harsh but I think that sometimes I just remember things when it's appropriate to the situation. Like in class and we were talking about independent thinking and the "right answer syndrome" and I remembered my student asking me what the answer was. I think that sometimes reflection is a good thing but now it's actually a good time to look at finding answers to all the questions that we were so puzzled about during our practicum. Yesterday's class was a good one. It finally gave me something to look forward to. The book thing actually makes things better because all our efforts at solving the "big picture" can now have some kind of end result. Maybe these thoughts are coming from a "goal" oriented person. I do have this need to always work towards something and for me "sitting around reflecting" just doesn't seem to cut it for me... At least not anymore. I really need to get moving on things.	"Reflection is good but I have had enough for now. Finding answers to real questions is something different."
ST 26 Jan	I just wrote a whole bunch about where our class is going and the book but somehow it didn't get posted. I will try again but more briefly this time. I agree with LL, CS, and TP that we need to start moving forward. I feel like I just cannot reflect anymore after all the "reflection" assignments such as the case study and action research. I feel I need to start preparing for next year; not by thinking about what I've done but what I need to do.	"Enough with reflection, which is not preparing me for next year."

Table 2. Excerpts from WebCT thread A: "SO I SHALL START..."

THREAD B: THE NATURE OF SCIENCE (13 postings over 24 days)

	Excerpts selected for illustration of discussion	Interpretation
TP 19 Jan	I'm not saying that I don't plan to get off the default soon, I was just commenting that as a TC with no teaching experience I could have probably aimed that workshop time more towards classroom management or one of those rookie teacher areas of difficulty. Also I wasn't sure of your teaching methods (i.e., whether what you present in workshops was different than what you do in class). There have been times where profs are more interesting outside of the lecture hall.	TP names a new topic but responds to something Tom posed in a message in a different thread.
TP 26 Jan	I'll start with a question, 'What does science do?' Pretty good, eh? I think science answers our questions but, as a result, also lets us ask BETTER questions. To me, that's the nature of science. A question is asked, and the answer is sought. Perhaps more questions arise along the way to the answer, and so the journey for one answer leads us down many paths. And in the end, we get the answer to the original question. So what? What does that answer do for us? Sure, we may feel good about knowing the answer, but I would say that the JOURNEY FOR the answer is (might be) more valuable than the answer itself.	"In science, the search for answers may be more valuable than the answers" (but NOT in the search for answers about teaching?)
EB 4 Feb	I find that one "difficulty" with teaching science is that we often need to use a simpler, less accurate model of nature so that the students will understand what we're talking about, while we know that there is a much more accurate (and more complex) model developed by scientists. Sometimes, people wonder whether teachers are doing their students a disfavour to use simpler models. I sort of have my own view on this, partly influenced by some reading I've been doing lately, but I'm wondering what other people think about this. In other words, are teachers really doing kids a disfavour by presenting kids with simpler and less accurate models? Also, related to this, is the whole idea of student "misconceptions", or as I prefer to call it, "alternative conceptions". For example, are teachers partly to blame for students' prior conceptions, or do these conceptions mainly stem from their intuition? Hopefully, this will spark a bit of discussion...	Several people in this private forum share an Educational Studies course that looks at science. EB seems to wonder if simplified models may encourage students' "alternative conceptions."
ST 9 Feb	I'm going to try this one, EB. I think that in no way are we doing students a disfavour by teaching them "simpler" models first even though we know there are more complex ones at the present. I believe that the thinking process should be the same for students as it is for the scientists who came up with these theories or models. Could we have Einstein's Theory of General Relativity now if Newton or Galileo had not come along first? I don't think so. So I think it's very important that students get to see science "building up" in order to understand it. We may have more complex models now but aren't almost all if not all based on a simpler, more confined one? Now that I think about it, we are probably doing them a favour teaching them simpler ideas first. Imagine trying to learn about electron clouds around the nucleus of atoms before learning The Bohr Model, or maybe this is a better analogy, trying to learn about the behaviour of mercury on the atomic scale before learning about hydrogen. The thinking process students have to go through connecting a simpler model to more and more complex ones is, I think, at least a few vertebrae of the backbone of their science learning.	ST argues that students should see science as it has developed (with increasingly complex models). WHY did I not notice that they were NOT viewing their own learning to teach as parallel to students' learning science?

Table 3. Excerpts from WebCT thread B: THE NATURE OF SCIENCE

THREAD C: ACTION RESEARCH....

LL initiated this thread a few days before action research reports were due from each candidate in the program. The experience of preparing those reports seemed to generate links to the nature of their early experiences with WebCT.

	Excerpts selected for illustration of discussion	**Interpretation**
LL 23 Jan	I was working at finalizing my action research [report] and it dawned on me that maybe this WebCT thing could have been more useful than I thought. I think that during my practicum I could have used this to gather some insight into the things that were happening in my class by sharing it with you. It's really too bad that this idea comes to me as hindsight.	"Using WebCT to share experiences during the early extended practicum might have helped me understand them better."
ST 26 Jan	Since I am a little behind starting this WebCT stuff I don't know whether this will help now but here goes. My action research is on using different ideas (such as POE's, demo's, labs, neat examples) to teach science (mainly physics). What I looked at was how these different methods fit in with my idea of teaching and how they might help mould and shape my idea. I also took a survey of the class to see how they felt about these methods. I have talked to a lot of other students as well and yes it does seem that every prof wants something different. So, I guess the important thing is to be sure that we know what our particular prof wants.	ST's posting illustrates how this thread was used to share core features of their various action research projects. ST also points to the general awareness that different professors seem to have different expectations for the action research project, pointing to the reality that "pleasing the teacher" occurs in preservice programs, just as it does in schools.

Table 4. Excerpts from WebCT thread C: ACTION RESEARCH

THREAD D: RECOGNIZING GOOD TEACHING

This thread spanned three weeks and had the greatest number of postings (15).

One week after the "Winter Term Learning" forum began on WebCT, I invited members of the forum to discuss an issue that would take them back to their Early Extended Practicum. This thread seems to have generated extensive SELF-STUDY.

	Excerpts selected for illustration of discussion	**Interpretation**
TR 24 Jan	I do still hope to lie low and not comment on everything I see. You may remember that I was eager to nudge you to connect this term's (dare I say it, reflections?) with last term's experiences, with a view to generating new meaning in the experiences. That was a trial balloon, and now I've got something specific to last term: DO YOU THINK YOU BECAME BETTER, AS WEEKS WENT BY, AT RECOGNIZING WHAT GOOD TEACHING IS? That's one question, and if the reply is "yes," then the obvious follow-up is "What are some of the criteria of good teaching that you could see in December that were not so apparent in October?" And if you are not tired after that, do you think your new/better criteria are influencing your reactions to the teaching you are experiencing here in the Crystal Palace?	**Recognizing good teaching TR** As I repeat my desire that this discussion be their own, I urge them to discuss how they look at teaching, in schools and in the Faculty of Education (which I encourage them to call "the Crystal Palace."
BE 24 Jan	As the weeks went by in the first six weeks of teaching, I felt that I improved dramatically as a teacher. I got away from my 'default' and tried some new and innovative methods of teaching (math). I took the advice of one of my colleagues and focused on quality rather than quantity. I recognize a good teacher as someone that cares about the students and that the students, in turn, respect the teacher. A good teacher is always trying to improve and find better ways of presentation rather than sticking with default ('because its easier that way').	In September I introduced the term "default" to refer to one's way of teaching that comes "naturally, without thinking." BE has used the term exactly as I hoped.
ST 26 Jan	If recognizing good teaching is discovering what I like to do in front of the class and what the students like, then I feel that I certainly got a good start. What really helped me at the beginning of our placement in the schools was that I already had taught some physics and math for about four months at a private school in London, Ont. I had had no formal "teacher training" (if I can say it that way) save the fact that I taught first year undergraduate labs at Western. Having this experience allowed me to start right off the bat in thinking about how I was teaching and how I could and would like to change. There wasn't the get comfortable and get all the nervousness out like there was when I first began teaching in Jan. 1999. With that said, there is at least one case I can think of part way through my placement that made me stop and think about what I was doing. Normally I don't give many notes but one lesson on sound was just jammed full of definitions and theory. I noticed half way through the lesson that I was really getting bored myself so I stopped and turned around and the class looked dead. I decided at that point that I would never let myself do that again. I thought about this later the same night and I decided that it seems you should really think about how you, as a teacher, feel about what you are doing because chances are that most students will feel the same way. How this fits in to "what good teaching is" is (I guess) that maybe good teaching is teaching by feel, what you feel and what your students feel. I realize now that maybe I've said a lot of nothing here but maybe it will stir up some discussion.	ST explains how some teaching experience made his Fall Term start easier. He relates a critical incident in which he resolved not to teach using his "default" and he suggests that it is important for a teacher to learn how a lesson FEELS to himself and his students.

LL 1 Feb	During the first practicum session, I found myself focusing on getting "comfortable" in the class. Since I was never in front of a class of students before, I found that getting myself used to this very idea was intriguing. After I managed to do that, I found myself finding out my "default" which was quite natural because I think we are used to seeing the "default" a lot during our own schooling experiences. I did recognize that I wasn't really a "good" teacher yet because the default teaching style did not really suit me. I realized that although the lesson preps are "easier" to a certain extent, it really didn't make science/math very exciting for the students. I guess what I think is a "good" teacher is a lot of things other than just covering "course material". Although the pressure of covering curriculum does exist, I think that a good teacher is able to provide lessons that are not just "covering material" but also allows students to direct some of their own learning through activities, POEs etc. However, I did find that when I returned to teaching for the second practicum that I did make more of an effort to do some other things in the class other than my default. I think that when I returned, I found myself trying to challenge myself more as a teacher by really focussing in on finding out what suits me the best. The time back at Queen's did allow me some time to reflect on "why I am a teacher" and "what I wish to give to students." I guess I think that a "good" teacher is much more than just knowing the curriculum and the content. I think those things are important too but I have no doubt that we all have enough knowledge to teach the material. I think that my goal here at Queen's is to discover what I can do to teach the material in a way that will enable students to learn more about their environment and make discoveries of their own. Making lessons more relevant to them and their experiences seems more important to me now than ever. I do recognize that I've been more critical about how things are presented to me. For example, the presentation yesterday when the two women started to read off the paper for the whole presentation.... I have to be honest, I did end up leaving early. I just couldn't take it.	LL extends the references to a "default" teaching style by describing how she looks back on her development over nine weeks of teaching two subjects in one school. She suggests that the two-week return to campus helped her take stock and refocus.
ST 10 Feb	[Guest speaker] did say a lot of interesting and important things yesterday but one really has stuck in my mind and I am so glad he said it.: "You don't have to be perfect right off the bat." I think those were his exact words. I really appreciated that he said that because the last little while I have been getting stressed out by some students I talked to in the faculty (they're not in Physics) who stay up until 1 or 2 a.m. working on things for school, making everything top notch. I realize that teaching is going to take a lot of work, but I'm sorry, not my whole life. I really enjoyed teaching during the practicum, but I need to have "fun" and participate in other facets of life as well. I guess I'm one who always remembers that you are only young once, although I don't let that blind me to the future. I feel that I can still do an excellent job without making it my whole life. Anyone else have this attitude or a similar one or want to comment?	After a former student teaching in a local high school spoke to the class, ST describes his relief at hearing that he does not have to be a perfect teacher on his first day.
EB 14 Feb	I would say my teaching changed quite dramatically from October to December. When I entered CP High in October, the idea of teaching an entire class was really quite new to me. There was a lot thrown at me here at McArthur in September, but I probably only digested about 10% of that information. When I started teaching, I didn't feel I had much to go by except my own intuition, I guess. To make matters worse, the other two science TCs at my school were [in the concurrent program and	EB describes vividly his sense of real progress over nine weeks, particularly when he made that essential shift from

	had previous teaching experience], and it seemed that I was expected to know the ropes just as well as they did right from the start. Anyway, I found myself so concerned with just delivering the subject matter that I sort of forgot that I was actually supposed to be teaching students. I think a real paradigm shift occurred in my teaching from October to December. I gradually shifted from teaching the subject matter to teaching students, and the idea of teaching people instead of subject matter really made me feel more comfortable with the idea of teaching. You can do the demos, you can do the POEs, you can even do cartwheels, but it's all for nothing if you're not doing it FOR THE STUDENTS. I found teaching to be much more rewarding once I had made this shift in my thinking.	essential shift from focusing on subject content to focusing on students and how they are responding to content.

Table 5. Excerpts from WebCT thread D: RECOGNIZING GOOD TEACHING

THREAD E: BATTERIES AND BULBS (AND MORE)—SO WHAT?

This short-lived thread involved my most successful response to candidates' concern that we DO science activities rather than reflect on their Fall Term teaching. The materials were simple in the extreme, yet many in the class discovered that they did not understand clearly several fundamental points about electricity.[4]

	Excerpts selected for illustration of discussion	**Interpretation**
TR 27 Jan	I sure had a lot of fun today. If anyone in our Forum wants to offer any comments on today's class, I'd really appreciate the chance to listen.	**Batteries and Bulbs (and more) —So What? TR**
BE 1 Feb	I am going to agree with ST. Thursday's class was excellent. It brings up the issue of learning by doing which puts us (the teachers) in the students shoes and allows us to realize that 'hands on' experience is priceless. I am looking forward to more 'gems' like this in the future....	BE wanted more of the same, and I found this a challenge.
LL 1 Feb	I was so glad to see us doing stuff!!! It was great! I really liked the concept. I did do this sort of thing with my grade 9 applied science class and it did work really nicely. Especially when you start off the unit by having them find things out on their own. I did really like how you didn't give us the bulb holders until after because it allowed for other discoveries which I didn't foresee when I did this activity.	LL describes how her own learning was affected by the teaching approach I used.

Table 6: Excerpts from WebCT thread E: BATTERIES AND BULBS (AND MORE)—SO WHAT?

[4] See Russell, T. (2000). In praise of simple physics. *The Physics Teacher, 38*, 306-307.

THREAD F: DISSENTION IN THE RANKS...

This one-week discussion reveals the potential of WebCT to permit public criticism of teaching. In reality, it provided a valuable opportunity for me to call attention to a teaching dilemma: How does a teacher respond to dissatisfaction expressed outside of class by one or a few individuals? TP opens and closes this thread of 11 messages, apparently influenced not just by BE's change of position but also by the contributions of others.

	Excerpts selected for illustration of discussion	**Interpretation**
TP 2 Feb	O.K., here are some thoughts I (and other nameless people) have had recently. Were the choices we made at the beginning of January 'true' choices? If they were, then we should spend some quality time in those groups. If not, then I think it should be formalized. Someone should say, "those choices weren't really choices, now stop whining and work on the book!" Someone in the class has already noticed the trend we're following and moved his/her name from one project to the book! Now there's a strong statement! There's too much openendedness, and too little time. Something, anything, should be formalized, finalized and fulfilled!	**Dissention in the ranks... TP** TP feels that choices offered to everyone were not genuine if considerable class time is being devoted to a project chosen by most but not all.
BE 2 Feb	I agree with TP. I am very interested in teaching strategies, and independent thinking issues that were brought up earlier in the term. I agree that this book has become somewhat of an issue for this class and I do believe that something should be 'formalized,' as you put it.	BE agrees that there are other issues that should be addressed.
TR 7 Feb	I deliberately ducked responding until now [5 days after TP began the discussion] to see if anyone else would join in. I hear what you are saying, but it appears that you are implying that I should be the one to do something about it. Why can't you two, and any others so inclined, raise the issue during class? I won't melt, I promise! I'd love to see what others would say. It's always tricky for a teacher, TP, when someone writes "and nameless others." I'm thrilled to see this sort of issue raised here--computers have that advantage. BUT most of the class can't see what you are saying--neither those who agree nor those who might disagree. Clearly the book is not for everyone. There's no reason why those who are not involved in "the book" can't work on their own things during "book time." The issue of "how is the book different from the Idea Bank?" is an excellent question to put to everyone. Who's going to make the first move? Who should??	I waited 5 days and then felt I should indicate my perspective on the issue. My goal was to have them, not me, raise the issue IN class for EVERYONE to explore and resolve in some way.
FP 7 Feb	I'm not as astute as I look. Please fill me in here. It seems to me that TP's complaint is that too much time was being spent on the book. Am I right in my assumption? That has not been the case in the last two classes. Has a correction been made, or was a larger time block allocated initially because of external deadlines? I'm happy with the open-ended assignments; If I spend an inordinate amount of time and effort and produce something worthwhile on "the book," I may have to change my weighting of assignments. I'm playing it by ear. I haven't been too concerned; I've been distracted of late by other matters. But you raise a good point in that we can only do a limited number of things at one time, and I want to know what I'm missing. I'm a terrible channel hopper with a remote control. What would you have us do, TP?	FP shares his position and asks for elaboration of the discontent.

	Excerpts selected for illustration of discussion	Interpretation
BE 8 Feb	I am going to have to agree with Tom on the book issue. TP, if you don't like what we are doing in class it would seem more wise to try and change it by making some suggestions in class or taking it upon yourself to do something different during the group work. I agree that we might have put too much emphasis on the book, so the last time we had group work DB and I elected to discuss something else (the Conceptual Physics assignment). It sounds like you are leaving it up to Tom to do something about the issue which doesn't seem right since he has left most of our own learning up to us (open assignments etc.), which is very respectable. Also, I don't think that this is what was in mind as far as discussions go here on WebCT.	BE now appears to support my position that it is a class issue. He also reports how he has dealt with the issue. He also questions whether WebCT is an appropriate forum for this issue!
LL 9 Feb	I have read the conversations as presented in this thread and I thought I would make my contribution. I have to be honest, Tom that I did read TP's and BE's initial starting bulletins and I refrained from responding at the time. Mostly because I needed to think about what I was going to write rather than ramble on. I do have to agree with Tom when he says that it's really up to us. Why does the teacher always have to direct the "learning"? Tom has always made it clear to us that it's "up to us" so how is it different when we discuss working on the "book"? I personally would not be offended if someone in the class decided to work on something else other than the "book". As for hurting feelings...well there aren't feelings to be hurt if you say you want to work on something else that you feel would be more beneficial to you and your learning. Maybe our problem is that we are not used to having to take responsibility for our own learning and when we have a teacher (Tom) telling us that we can do whatever we want, it just makes all of us a little nervous with the whole notion. Maybe I'm making too big of a generalization.	LL appears to follow up on BE's position stated a day earlier. More than anything else, this subset of the class is having an opportunity to unpack and examine my challenge that they direct their own learning this term. Would it be worth requiring everyone to participate to see this? Probably not.
TP 9 Feb	I'd like to thank everyone for their input into what I saw as an issue. It's really amazing what can be learned in one week, and I think that this WAS the right place for this topic, because it addressed the class, but not the whole class. So it was a risk, but a smaller one than if I had presented what I refer to as "my rant" to the whole class. I'd like to end this by saying that I no longer view the book as an 'issue'. It is merely a choice. And LL is more right than she knows when she said: "Maybe our problem is that we are not used to having to take responsibility for our own learning and when we have a teacher (Tom) telling us that we can do whatever we want, it just makes all of us a little nervous with the whole notion." Even after all the time spent here, I'm still not used to being responsible for my own learning. But I'm trying.	TP argues that this was an appropriate issue for a WebCT discussion. This appears to have been a very valuable self-study exercise for TP and others.

Table 7. Excerpts from WebCT thread F: Dissention in the Ranks...

THREAD G: PHYSICS SECOND TEACHABLE

This thread generated five postings in 43 hours and illustrates well how beginning teachers can work through an issue that one person identified and then invited others to comment. This SELF-STUDY had an interesting sequel more than two months later, when BE had his first opportunity to teach physics.

	Excerpts selected for illustration of discussion	Interpretation
BE 3 Feb	During today's class I was discussing teaching physics with the people at my table. It came to my attention that personally I don't think that I want to teach physics. I am a math major since the beginning of time. It was my interest in math that assisted me in becoming successful in physics. After taking physics for some time, now I have developed a great interest in the subject. I love courses that really make you think and analyse situations (relativity, astrophysics. etc.) but I do not wish to teach them at the high school level. Just a personal preference I guess. It might be that I have thought about teaching math since the start of high school and now I have a one-track mind. Or maybe it's because I am lazy and don't want to bother, but at this point I think that I have the right to be lazy. (Why do most family doctors take Wednesdays off? who cares, they earned it) This brings up the point of "Am I wasting my time in this class?" Absolutely not. NO NO NO. People say that you get out what you put into teachers college and I feel that I am getting the most, lately, out of this class. Also, I am relearning the physics material that first made me interested in the subject, and that is exciting. I am, however, interested in how we can incorporate physics concepts into a math classroom since the two are very closely related. I don't know if anyone else is in the same boat as me here,but I am curious to hear others' remarks on this issue. The issue I propose is, 'Are you interested in teaching your second teachable - whatever it is?' Please explain yes or no.	In Ontario, every candidate in the secondary program declares two "teachable" subjects and must have a minimum number of undergraduate courses in each. BE finds that his physics method class is very valuable but he still seems himself as a "mathematics" person who does not what to teach physics. He wonders if any others feel the same way.
TP 4 Feb	Well, Physics IS my second teachable... Chemistry is my first, but it seems that somewhere along the way I lost something with chemistry... Maybe it had something to do with the way the last two years of my undergrad were scheduled. I did very little chem and lots of physics, because I needed 4 credits in physics to qualify for B.Ed. here. I already had my req. 5 creds. in chem, so it was catch up time for physics. I guess I'm just out of touch or out of practice or something... Ok, I'm just rambling now... it's late and ST, DB and I just left the bar! Wheee, now that's where physics get's talked about! And that's another story altogether!	TP adds to the thread in the wee hours of the morning, explaining how his first teachable has moved into the background somewhat.
FP 4 Feb	I'm interested in teaching students. My second teachable is physics, but that's just because I put math and physics down in alphabetic order. Funny how we learn better when we put things in separate boxes and concentrate on one box at a time. But how different are they? How related are they? Didn't Newton invent calculus so he could do physics. If science is the extension of our model of reality (some would say a tool for that purpose), then what part do math and physics play in this process?	FP sees his subjects as equal and himself teaching students. He also reminds us of the close relationship between physics and mathematics.
ST 4 Feb	I'm not in the greatest thinking mode this afternoon but I really liked BE's message and thought I would respond. My second teachable is Math and yes, I am very interested in teaching it as well as Physics. I think the main reason is that I really enjoy working at, learning, and of course teaching Math. I understand BE's situation though. Maybe this isn't true for him but I think it is for some: Most of us go through university for four years and major in one subject but we are asked to provide two teachables. I know I had to convince Queen's that my	ST extends the discussion first by considering the issue of one undergraduate major and the need to provide two subjects as "teachables."

	Excerpts selected for illustration of discussion	Interpretation
	Mathematical Methods in Physics course should count as a math credit (it's a physics course). So I can see how some people would just have to pick up a couple courses in something to give them another teachable, simply because they have to have two. I don't know if this poses any major concerns for anybody and even more so, if it does, I don't know that anything can be done about it. I also liked how FP brought up the issue of Math and Physics being so interconnected. I completely agree. I hope to be able to teach quite a few math concepts with physics ideas and applications. After all, it appears that a concern in math classes now is that students cannot relate math to anything and they feel it serves no real purpose. Possibly, if they see that it does have a wide range of applications and real-life uses, then they will be interested and appreciate it more.	ST goes on to extend FP's thoughts about the close relationship between physics and mathematics.
LL 5 Feb	I thought I'd reply to BE because some interesting issues did arise. My second teachable is math, so I'm opposite to BE. To be honest though, I really don't have a preference from one or the other but I would prefer to teach physics. FP does make a good point about how math and physics are so interconnected and, really, I don't see how they are that different. I do find it troublesome that students often can't transfer skills learned in one class into another and maybe as math teachers we need to address these issues in our math classes. Because my undergrad degree was in physics, I think that I do prefer to teach physics. I guess it's more of a comfort thing than anything else. Maybe it's because I was educated in the same way as some of these other students and I too am guilty of keeping certain things separate from each other....	LL makes the final posting to this WebCT thread. She shows how carefully the contributors have considered each other's views. She also joins the discussion to the teaching issue of helping students to link one subject to another.
BE 12 Apr	I have been teaching two Grade 12 advanced/general physics classes for that last three days (I started right into it on the first day). I have been teaching a unit on forces and things couldn't be going any better. I started off the unit by having the students measure their hang-time to get used to working with gravity (an activity from Hewitt's Conceptual Physics, the Spud Webb thing.) Next we started talking about the universal force of gravity and the students loved it. Friction is next with a bunch of activities, including the tug of war!!!!!! Next unit is Newton's laws and I can't wait. I have so many POEs in my head that I want to use, I just hope that I can remember them all. I think that in the last 3 days (hope I'm not jumping to conclusions here) I have been kind of converted to a devoted math AND physics teacher. I find that the classroom environment is much more open and active and FUN. There are so many more possibilities in a physics classroom. I feel really overwhelmed now. Anyway, I love it. Thanks for your concern.	SEQUEL Preparing this paper reminded me that BE had just begun his first opportunity to teach physics. An e-mail message produced this response revealing the high impact of personal experience! (A second e-mail message gave permission to include this here.)

Table 8. Excerpts from WebCT thread G: PHYSICS SECOND TEACHABLE

THREAD J: BIG PICTURE: EXPERIENCE AND ... (THEORY?)

This thread is the second one that I initiated to provide an incentive to SELF-STUDY. This thread generated the second largest number of messages—14, over seven days.

	Excerpts selected for illustration of discussion	**Interpretation**
TR 10 Feb	After almost five weeks "on campus," with one more week to go and then only a short and busy three weeks on campus in late March, what's your sense of the BIG PICTURE of how this time fits into how you are learning to teach? I get some of this from some people in the "story" assignment, but I'd be really interested in what might unfold in a discussion of the sort that's possible here on WebCT. It will ALWAYS be the case that school experience matters most in a program like this. But I'm seeing (just in our class) a very broad spectrum of reactions to the on-campus time. Some people seem consistently positive, constructive and motivated, while others seem overwhelmed by "the student role" and quite unable to move beyond it. Naming names is irrelevant, but each of you must talk to a number of people who display a range of reactions. What do you see as the nature of the challenge of on-campus work? What sorts of changes to the program would help EVERYONE stay engaged? What DOES the time at McArthur provide? "Theory" may not be the best label for it. What do you see yourself taking from these weeks, and what changes would enable you to feel more challenged and more productive? If this period should be more closely linked to last term's teaching, how would you do it?	**Big picture: Experience and ... (theory?) TR** I tried to provide a sense of the range of reactions and responses that I was observing and reading about in assignments. I also posed questions that I hoped would generate productive discussion.
CS 10 Feb	For me, the five weeks we've had at the Faculty have served to help me focus on the ideas and ideals of teaching. During my practicum (I'm sure this was the same for everybody), things were very busy. It was easy to slip into a "coping" mode where I would quickly plan a lesson to make sure the material got covered, without giving much thought to how to present it. I left the Faculty in September all fired up with the notion of more hands-on learning, lots of POEs and experiential education. However, these ideas got lost in the day-to-day grind of "making it through the day." It's good to be reminded of the ideals and philosophy of teaching, and focusing on "being better teachers." To that end, I would love to see more activities like "Bulbs and Batteries." It's one thing to commit oneself to ideals of effective teaching, but quite another to actually see something and say "I want to try that!!" So I guess I'm saying that the "theory" focus is good, but it needs to be punched up more with actual examples, applications, and activities. (Much as we hope to do in high school science classes!)	CS finds the on-campus time valuable for reconnecting with values and ideas. He urges that "theory" be illustrated by activities, and draws a parallel between classes on campus and classes in schools.
FP 11 Feb	It is a wonderful opportunity to reinforce the lessons I learned during my teaching practicum, particularly the POEs. I was disappointed generally in my performance yesterday, and it was a wake-up call for me. I had slipped back into student mode. I was not sufficiently concerned about its success, the pendulum having swung back from my previous over-concern. As Master of Ceremonies for my POE, I did not wait for your attention. I was not well organized on the board. I did not try it with the materials in the school first. Just like learning any subject, we can only swallow so much before we have to digest it. This is our digestion period. Doing the case-study and action research report and story helps us to reflect, and digest our practicum learning. It also takes a large amount of time, time that would not be available if we were teaching. I think we need this time.	FP also finds value in the on-campus period of time. He moves directly into self-study by sharing his interpretation of a demonstration he did for the class on the previous day.

BE 12 Feb	As a student in the W-Queen's program, I think that I might have a different outlook than many people here at Queen's. I have one more year of school to complete so the motivation to 'digest' this information (as FP stated) is hard to come by. Imagine, for example, you really want to learn how and be able to ride a bicycle. Your big brother is going to teach you how to ride and give you the opportunity to ride for a short time, but after your training is done you have to put the bicycle in the garage for another 16 months without touching it. You know that in 16 months you are not going to forget how to ride, but right now, what's the point on paying attention to detail? My motivation has been trying to gather as many resources, ideas and strategies as I can in order to save them until 16 months from now. Things that I am not motivated to learn or remember come from things that I feel are not going to help ME become a good teacher. Things like POEs and asking your class 'so what?' are things that people remember and use, but things like why the teacher got sued in the "capture the flag" case study or "10 ways to identify students with LD" are not. I do believe that we learn the most when we are getting our hands-on experience but these six weeks have allowed me to think about things that I have done and think of ways to improve them. I have witnessed many new ideas that I would like to use in the future. Plus, it is nice to be a student at times.	BE presents his own minority perspective, as a member of a small group of candidates who have not yet completed their first degree. He provides specific examples of activities he finds more and less valuable. He also speaks of the inevitable issue of the student-to-teacher transition.
TC 13 Feb	First I have to comment on WebCT. WOW! I can't believe the amount of participation that has taken place this winter term in comparison to the fall term. The ball is certainly rollin'! Honesty is a great thing in most cases (as long as we don't insult or put someone else down). I think that WebCT allows people to express their views in a way that removes us as people from the situation. Personally I'm not going to be embarrassed when I hit the "post" box on this page, no matter what I've written. This hockey season at Queen's hasn't been as intense as the ones in the past but I have managed to raise teammates' emotions to make them feel that the only thing that matters on the ice is scoring on me. When we step off the ice there's no hard feelings whatsoever. We know that what had just happened (an hour and a half of intense competition) has made us better. What I'm trying to say is this: On the ice, during hockey practice, things can get very intense and how teammates react to things makes the world of difference in the big picture. The same goes for WebCT: Some things can be written with intense content, but as long as the writer has written with the goal of making things better and as long as we all react positively about these situations, we will all benefit. *Good hockey players react well to criticism *Tom reacts well to the criticism that gets thrown around about the course *Therefore Tom may be a good hockey player!	TC shares interesting insights from parallels that he draws between hockey practices and WebCT. He urges that people bring the same intensity to WebCT that he tries to inspire as goalkeeper during hockey practices. This highlights the potential of WebCT to provide a way to separate issues from personalities.

	Excerpts selected for illustration of discussion	Interpretation
TP 13 Feb	As for the last five weeks..., I really have the sense that everything is rushed. "We have to fill these TC's as full as we can as fast as we can" might be a good motto to put over the front doors of the place.	TP succinctly names his overall sense of the time on campus.
EB 14 Feb	I've read other people's responses to Tom's question, and overall I have found myself agreeing with what other people have been saying. I sort of have mixed feelings, though, about the six on-campus weeks here at the Crystal Palace. On the one hand, as CS was saying, the weeks here have helped me to "regroup" and think more about becoming a better teacher. I have picked up countless great ideas from my profs and colleagues during the time here. On the other hand, I find myself dying to just get out there and teach! Also, it's difficult for me to link this period to last term's teaching, because it's been almost two months now since we were in the schools. I was more motivated to do the "linking" during the two weeks here in November, because I had recently been teaching, and I had a lot of questions and ideas still lingering in my mind. The weeks of practicum in December also raised a lot of questions and issues for me, but I think a lot of that was lost during the two-week break. Perhaps I just have a really bad memory, but I found it challenging to reach back to the past to refresh myself on what I was thinking way back in December. I was keeping a journal back in the Fall term, but I didn't write down as much as I probably should have on my "daily reflections" or whatever.	EB identifies the tension between valuable time to gather thoughts and the natural urge to test ideas in a real classroom. He points to the negative impact of the three-week break between terms in making it much more difficult to "link" experiences with ideas.
LL 14 Feb	I guess I can be considered to be one of those who kind of sit on the fence on this one. There are times at Queen's when I think that it's really worthwhile to be here and then there are others that really make it difficult to remain motivated. However, I've managed to come up with my own goals while I'm here and I've been spending time doing those things that seem important to me. I realized that the program here is quite unique in that we have the flexibility to do as much or little as we want while we are here. The time does seem to fly by quickly and I really don't know where it's gone. It's hard to believe that we only have a few more weeks together!! I'm not sure how everyone else feels but I feel like the rest of the time here isn't really about "how will I teach" anymore but it's rather a time to be collecting resources and ideas which will help me teach when I'm out there. I don't want to go back to a style of teaching which just involves me lecturing and it would be best if I can leave here with "stuff" so that I will not be enticed to go back to those ways.	LL shares the tension that CS, EB and others have identified. She offers the interesting insight that it is important to gather resources that will help her avoid the default style of "just lecturing."

Table 9. Excerpts from WebCT thread J: BIG PICTURE: EXPERIENCE AND ... (THEORY?)

The preceding data were generated within a private forum in the Bulletin Board facility built into WebCT. Table 10 provides further illustration of the complex technological package offered by WebCT. The course owner can call up a "Student Tracking" option that provides information on first and last access to the WebCT site, as well as the number of messages read and posted by each individual. "Student Tracking" for the entire class showed that the nine volunteers for the Winter

Term Learning Forum had many more "hits" than others in the class, whose hits ranged from 51 down to 0 (two individuals among 17). WebCT automatically records a "hit" each time an individual logs in with his or her password.

	First Access	Last Access	Hits	Read	Posted
TP	Sep 23 15:38 1999	Apr 13 10:44 2000	**328**	174	35
FP	Sep 20 20:23 1999	Apr 1 11:17 2000	**228**	146	30
EB	Sep 22 16:40 1999	Apr 9 12:38 2000	**226**	172	7
CS	Sep 21 22:57 1999	Mar 20 21:29 2000	**187**	139	11
LL	Sep 20 19:02 1999	Mar 22 20:07 2000	**160**	108	16
ST	Sep 23 13:38 1999	Apr 7 12:03 2000	**158**	107	14
TC	Jan 18 21:35 2000	Apr 10 18:19 2000	**155**	121	3
LG	Sep 15 15:16 1999	Apr 11 12:58 2000	**152**	96	12
BE	Sep 23 9:27 1999	Mar 19 18:43 2000	**146**	106	13

Table 10. WebCT "student tracking" summary for the nine participants in the forum on "Winter Term Learning"

Discussion and Conclusion

The conclusions announced in the introduction can now be revisited and elaborated in light of the preceding data.

1. **WebCT provided a unique forum for those who were willing to take the time to discuss particular issues and share their experiences and views. Self-study by candidates was readily apparent.**

How interesting to speculate how the preservice education program experience for these nine volunteers would have been diminished had they not engaged in the WebCT forum. Whether in response to my prompts (Threads D and J) or to their own topics, each individual shows clear signs of beneath-the-surface examination of her or his personal professional learning.

2. **WebCT gave me, as teacher, insights into reactions to my teaching that I was not likely to gain in any other way. My own self-study was stimulated and I gained valuable opportunities to improve my teaching.**

Thread F, "Dissention in the Ranks," was the most obvious stimulus to studying my own teaching. Yet virtually every message I read contributed additional information about those I was teaching, and I found such information valuable in planning my lessons. In further work with WebCT, I see now that it would be valuable to document the interaction between reading messages on WebCT and making plans for my lessons.

3. **New technology involves a learning curve. Individuals seemed to become comfortable quickly and made good use of what the technology enabled them to do.**

I would like to know how the participants interpret what they achieved in this study of their own learning. As the technology went by me for the first time, as a participant, I liked the questions that I was prompted to ask myself. Reviewing and interpreting the entire dataset has shown me that there was much more going on than I realized each time I looked to read and consider posting a message. I would like to do a better job of getting an overall picture as the forum proceeds. The WebCT technology facilitates compiling messages within threads and doing that would be my first step.

4. **Some individuals contributed far more than others. All seemed comfortable with the variation in number of contributions.**

TC's contribution to Thread J on 15 Feb, cited beneath the title of the paper, was the most obvious comment on the process and his comments about putting views out for debate and then relaxing together afterwards probably helped everyone with an issue that is bound to arise as some point for any participant. On several occasions, TP publicly urged EB to make a contribution, and EB seemed to consider this a normal part of his friendship with TP.

5. **Making WebCT optional was the right choice for my first attempt to explore what is possible with the technology. I plan to continue to encourage people to take up the option while I provide meaningful alternatives for those who do not.**

After using WebCT in this course and in an M.Ed. course on teacher research, I am reluctant to make WebCT participation compulsory. Most teacher candidates are comfortable with electronic mail and computers, but patterns of access and use vary widely. Similarly, willingness to participate in discussion is not universal. Had this forum been compulsory, I believe the end result would have been very different.

6. **Revisiting the WebCT discussion provided a unique and invaluable way to see how those I was teaching were affected not only by my moves as their teacher but also by various elements of the overall preservice teacher education program structure.**

The participants did not see themselves restricted to talking about the class we shared, and I am as interested in their reactions to program elements (as in thread J) as I am in their reactions to my own teaching.

I have been active in the field of self-study and teacher research since the early 1990s. My strong interest in fostering reflective practice was propelled forward by the work of Schön (1983, 1987), which has its roots in the work of Dewey (1933). The remarkable development of the "teacher research movement" in the 1990s (Cochran-Smith & Lytle, 1999) provides even more reason to initiate and support reflective practice and self-study in programs of preservice teacher education. At a very opportune moment, WebCT now provides a significant "technological leap forward" in support of self-study. WebCT seems particularly well suited to fostering self-study by preservice teacher candidates willing to make the commitment to the technology and the sharing of personal views and experiences.

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